Rethinking the contributions of young people with learning disabilities to iPad storymaking: a new model of distributed authorship

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Abstract

Digital technologies such as iPads are now ubiquitous in classrooms and family homes, enabling new possibilities for all learners but particularly for those with disabilities. Existing literature explores how children with learning disabilities create and benefit from personalised digital stories but does not unpack theoretical understandings of their 'authorship'. This paper addresses this gap by proposing an original model of 'distributed authorship' with three axes of distribution—interpersonal, technological and temporal—to account for the authorial contributions of young people with learning disabilities. Five families were given an iPad with Pictello storymaking app and instructed to use it with their young person in any way which was engaging for them. Data generation over 12 weeks included weekly diaries, home videos, semi-structured interviews and story collection. Findings indicated that whilst ability to directly engage with the app varied, all the young people could be said to exert authorial influence on the stories distributed across three axes: support from others, support from the technology itself and incorporation of prior embodied agency. The study has theoretical implications for our understanding of 'authorship' as well as implications for pedagogy and practice by reconceptualising severely disabled children as literate learners and co-authors.

Key words: Digital literacies, mobile technologies, authorship, learning disability

Introduction

Storytelling, it seems, is a vital ingredient of human experience. This being so, it is relevant for everyone, including those who have the most profound intellectual and sensory impairments. (Park, 2012, p.40)

The sharing of stories about oneself is critical to development of social identity, inclusion, relationships and emotional development (Bunning et al., 2017). Storytelling can develop 'language comprehension, emotional well-being, empathy, a sense of identity, imagination, creativity and literacy skills' (Grove, 2012, p.1). People with spoken language draw upon vast repertoires of personal anecdotes, retelling and embellishing to enable connection over shared human experiences. It is therefore important to explore how children who have complex communication needs and little or no spoken language may be enabled to participate in the human experience of creating and sharing stories.

Recent years have seen a surge in interest in the role of mobile technologies such as iPads in literacy practices, specifically the affordances of storymaking applications ('apps'), which facilitate the assemblage of photos, videos, typed text and audio voice recording to create a personalised story. These stories may be particularly inclusive of disabled young people, with their multimodal affordances resulting in increased accessibility (Kucirkova et al., 2014). Such deployment of mobile technologies in literacy is consistent with the direction of international policy: For instance, the UNESCO Strategy for Youth and Adult Literacy (2020–2025) identifies as strategic priority areas to address the learning needs of 'disadvantaged groups' and to leverage 'digital technologies to expand access and improve learning outcomes' (UNESCO, 2019).

An under-researched area in relation to the use of such apps by young people with the label of 'learning disabilities' is the meaning of 'authorship'. Some disabled young people can directly interact with the app and author (in a conventional sense) their own story by uploading pictures, videos, text and/or voice recording. Others will require significantly more support or scaffolding in app usage from another person who might be described as a 'creative-scriber' of their expressed ideas (Satchwell, 2019). For some, such as young people with the UK-based educational label of

Profound and Multiple Learning Disabilities or PMLD (better known internationally as Profound Intellectual and Multiple Disabilities or PIMD), story elements deemed of interest or relevance to them will be assembled by another. In this case, a conventional understanding of 'authorship' might view the child as the *inspiration for* or the *subject of* the story, but not the author since but they have not actively assembled the story.

In contrast, this paper proposes a new model of *distributed authorship* with three axes of distribution—*interpersonal*, *technological* and *temporal*—which acknowledges young people with the most severe disabilities as co-authors of iPad stories. This argument is not merely of theoretical interest in terms of reconceptualising 'authorship' but equally has implications for pedagogy, policy and practice. Viewing *all* young people as potential 'authors' redefines their relationship to literacy and means they can be considered not only 'recipients', 'audiences' or 'subjects' of stories but equally can contribute to story content. It also positions them as valid users of resources such as storymaking apps rather than confining their mobile technology use to the simpler cause-and-effect apps often recommended for disabled children.

Background

Multimodal digital stories

Various apps exist to enable the creation of digital stories using mobile technologies including iPads. Such apps facilitate the assemblage of photos, videos, text and audio recording of one's own voice (or narration by a built-in voice) to create a personalised, multimodal story. Natalia Kucirkova has written extensively on the value of personalised iPad digital stories (Kucirkova et al., 2013; Kucirkova et al., 2014; Kucirkova et al., 2015). Kucirkova finds variation in the 'expert/novice balance' (p.436) in parent–child dyads when authoring a story, with some stories being more 'parent led' and others having 'a more negotiated and balanced learning space' (Kucirkova et al., 2015, p.437). She notes that the multimodal affordances of such stories with their audio and video content 'blur[s] the boundaries between the books and the oral recounting of an event' (Kucirkova et al., 2014, p.45). Dunn and Sweeney (2018) note that for some children with learning difficulties, being able to contribute to an iPad story by recording your own voice may be 'less threatening than writing' (p.864). As Winters (2010) argues, 'multi-modal pedagogies grant some students more access to authority and agency because they privilege additional modes of communication other than the spoken and written word' (p.9).

The evolving meaning of 'authorship'

The question of who or what constitutes an 'author' has been extensively discussed. Schonert (2014) notes that the significance of a single named author as a legal entity with material entitlements and personal responsibilities gained traction with the advent of the printing press and particularly from the 18th century onwards. However, the single named author has since been subject to critique. In *The Death of the Author*, Barthes (1967) deconstructs the problematic binary of producers/consumers of texts, describing a text as 'a multi-dimensional space in which a variety of writings, none of them original, blend and clash … a tissue of quotations drawn from the innumerable centres of culture' (p.146). For Barthes, the author is a mere *orchestrator* of what is already written: 'his only power is to mix writings, to counter the ones with the others, in such a way as never to rest on any one of them' (Barthes, 1967, p.146). Kristeva and Moi (1986) use *intertextuality* to signify how texts are inevitably imbued with prior texts, whether through implicit or explicit allusions, or simply through immersion in a common repertoire of linguistic and literary practices.

Such critiques of the autonomous author have paved the way for the idea of *distributed authorship*. This concept has already been mobilised in diverse contexts including feminist scholarship (Callahan, 2013); translation and copyright (Lee, 2020); blues and jazz music (Leo, 2020); and collaborative online resource such as Wikipedia (Kennedy, 2016). In the sections which follow, I review literature which maps onto the three axes of the distributed authorship model proposed by this paper: *technological*, *interpersonal* and *temporal* distribution.

Technologically distributed authorship

Authorship can be seen as *technologically* distributed across human and non-human actors, which 'powerfully disrupts notions of authorship and agency around digital texts' (Gourlay, 2011, p.6). This invokes post-human conceptualisations of the *cyborg* (cybernetic + organism), a part-biological part-mechanical system that results in an augmented whole (Haraway, 1991). Valley (2021) considers the benefits of encouraging her undergraduate creative writing students to develop a 'cyborg voice' by producing a hybrid human/artificial intelligence (AI) text. As her students experiment with the affordances of bots, predictive text, interactive fiction software and repeated iterations of Google Translate to produce 'strange new works' (p.3), they learn to question their previous understandings of 'authorship', 'writing'

and 'ownership'. Dunn and Sweeney (2018) examine how children in mainstream primary schools author iPad stories. Whilst not explicitly drawing on distributed authorship or cyborg theory, they note how the affordances of the iPad augments the literacy level of the children. For instance, the 'predictive text' feature which guesses the word the child is attempting to type has a scaffolding effect, which in the words of one teacher 'pushes their literacy a little bit further' (p.864). Similarly, the 'autocorrect' feature facilitates the correction of 'little grammatical errors' (p.864).

Of particular interest here is the interplay between 'assistive technology', disability and authorship of a text. The term 'assistive technology' is generally taken to denote technology specifically designed to support disabled users, although one could question its distinctiveness from everyday non-disabled use of technology which assists (for instance, voice-to-text dictation on smartphones). In future, the universal usability movement which promotes inclusive design and customisation options on everyday devices such as iPads may reduce the need for specifically designated 'assistive technology' (Mankoff et al., 2010). Literature points to the ever-evolving relationship between human and technology and the future possibilities, which tip the balance even further towards non-human authorship. For instance, children with PIMD have been enabled to generate soundscapes through BioMusic by wearing non-invasive sensors which measure a range of autonomic nervous system signals and converting them to music to convey the child's affective state (Blain-Moraes et al., 2013). The balance between human and technology in relation to authorship and creativity therefore continues to evolve with profound implications for disabled people.

Interpersonally distributed authorship

Web 2.0 has resulted in newer modes of communication constituting a 'restructuring of power in the field of representation and communication' (Kress, 2003, p.17), with creation and distribution of multimodal information through YouTube, print-on-demand, podcasts and blogs. This produces interesting questions of copyright and ownership in terms of 'distributed authorship', which is characteristic of websites such as Wikipedia where multiple contributors may amend or add to previous entries (Kennedy, 2016). Thompson (2011) discusses the phenomenon of the *mashup*, 'a combination of two or more digital songs, videos, or images that are mixed together in new ways … commonly used for political commentary, humor, and critique' (pp.179–180). This causes 'great headaches' for the copyright industry (Thompson, 2011,

p.181) by challenging conventionally understood notions of originality and authorship. Such mashups might be described as simultaneously *interpersonally* and *technologically distributed authorship* since they depend upon multiple human contributors, the affordances of video editing software and the distribution capabilities of social media.

Interpersonally distributed authorship is rarely discussed in relation to disabled children. Satchwell (2019) argues that whilst disabled young people may not have 'the social or cultural capital required for writing and publishing their stories autonomously' (p.79), they must nevertheless be recognised as 'privileged possessors of the knowledge of their own lived experiences' (p.79). They can work with co-authors who can provide the motor or linguistic skills required for story transcription, whilst the knowledge content remains the possession of the young person. Satchwell (2019) describes the authorship of David, a young man with Down's syndrome whose verbally expressed ideas were shaped into a fictional narrative through the work of a 'creative-scriber' who added 'phrases and information required for continuity and coherence' (p.80). Content was also incorporated into the story from a young man who produced 'a beautiful drawing of a dragon' (p.81), which subsequently became the story's digital logo. In conclusion, Satchwell concludes that 'collaborative co-construction offers an opportunity for an otherwise silenced voice to be heard' (p.84).

This type of collaborative storywriting raises profound questions about the nature of 'authorship'. For instance, in the above example, David actively generates ideas, characters and plotline and simply needs linguistic and narrative scaffolding. It is perhaps not too difficult to see David as an author, given his intentionally generative role in the storymaking process. The case of the dragon artist, however, pushes further at the boundaries of conventionally understood 'authorship', raising the question of whether a drawing which may or may not be intended as a story contribution can constitute 'authorship'. This question will be unpacked further in the context of the current study.

Temporally distributed authorship

My third axis of distribution is *temporally distributed authorship*. Here, I draw upon Dreyfus (2006) who looks to past interactions and events as an interpretive resource in the meaning-making of her non-verbal son. As an example, she describes how her son might point at a street he passes in the car. This simple gesture has added meaning if the adult can draw on

prior interactions to contextualise the significance of the action: In this case, the meaning becomes something akin to 'My friend lives there, doesn't he?', which requires an affirmative response. Dreyfus (2006) argues that his communication is therefore temporally distributed, drawing upon past shared experiences and mutual understandings to augment the restricted meaning of the simple gesture performed in the here and now.

Active participation in an event which occurs prior to the assemblage of a multimodal story—such as a visit to the zoo—might therefore be said to constitute a form of temporally distributed authorship. From a conventional/realist perspective on literacy, to describe the child as a co-author here might be a stretch too far: The child might be described as the *subject of* or *inspiration for* the story owing to their prior actions at the zoo, but story *authorship* belongs with the person who assembles the story. On the other hand, it could be argued that the child is the 'author' of a multimodal embodied 'text' (their experience of the zoo), which is then transposed into the more linear format of a story by a co-author. As Norris (2004) argues, embodied (fleeting) and disembodied (enduring, artefactual) modes are not categorically distinct but rather exist on a continuum, with 'texts' such as stories, photographs and videos inevitably containing the 'frozen' embodied actions of the actors who created them. Norris (2004) goes on to argue that even where an action is not represented in video or image, it still possesses its own 'momentary materiality' (p.43), which challenges the position that in-person interaction lacks the materiality of a written text. From this multimodal perspective, the parent and child are co-authors of a story, which is both *temporally* and *interpersonally* distributed; since the parent's role is to render in words (and image, audio and video), the events of an original lived 'text' by the child in a form of transmodal intertextuality.

Similarly, Grace (2017) argues that some of us are predominantly *Linguistic Beings* whose brains and lived experience are shaped by the linearity of words, whilst others including profoundly disabled children are predominantly *Sensory Beings*. This latter group do not mediate lived experience through language, instead experiencing life as sensory, embodied and rooted in the here and now. Grace views both ways of being as 'equally as valid' (p.9): *Sensory Beings* offer a powerful reminder to refocus on mindful lived experience, whilst *Linguistic Beings* can offer 'a link with the world of words' (p.10). Whilst Grace was not writing in the context of authorship, her position suggests that *Sensory Beings* can be seen as authoring 'stories' through their embodied responsiveness to events which *Linguistic Beings* (parents) can then translate into the more linear format of a story.

Methodology

Theoretical framing

The theoretical framework of this study draws upon ethnography, multimodality and 'inclusive literacy' (Flewitt et al., 2009). From ethnography, I draw a commitment to foregrounding the emic perspective of families and disabled children/young people, recognising them as 'valuable experiential experts' (McCord and Soto, 2004, p.215). From multimodality, I foreground the diversity of human meaning-making across multiple modes and the need to avoid automatic privileging of speech and written text (Jewitt et al., 2016). In particular, this means recognising the significance of embodied idiosyncratic communication of 'non-verbal' research participants and its implications for their agency as research participants and authors. Following 'inclusive literacy' (Flewitt et al., 2009), I conceptualise 'literacy' broadly as encompassing the social, embodied and material dimensions of meaning-making, rather than the narrower 'functionalist' skills of independent reading and writing.

Setting and participants

Five participating families were recruited through 'special schools' in the Midlands of England. Schools were approached based on two criteria: geographical proximity to the researcher and a broad spectrum of learning disabilities within the school population as indicated on the school website. Recruitment materials emphasised that non-verbal, non-reading, non-writing learners were welcome to participate. Following recruitment, schools had no further involvement in the study. All storymaking activity took place in the young person's own home and all my contact with participants was online (email and online video platforms) due to COVID-19 restrictions in England. Figure 1 provides some contextualising information on the five young people who took part.

Materials

The Pictello app by AssistiveWare (2022) was selected for two reasons. Firstly, Pictello is designed for disabled users and has a range of customisation features which maximise the inclusivity of the study. These features included 'switch access' for users who cannot operate touchscreen technology, word prediction to support users with limited conventional literacy skills, auditory instructions, 'speak as you type' and playback of written output. Secondly, because Pictello has

Pseudonym	Age	Description of literacy and communication skills	Diagnoses and educational labels	Pseudonym of Co-Authoring Adult
Eve	10	Can use approx. two manual signs (for songs) and can make choices between two photos representing items. No speech, reading or writing. Home communication centres on interpretation of Eve's idiosyncratic embodied communication.	Disorder of brain development* Profound & Multiple Learning Disabilities (PMLD)	Anna (mother)
Gavin	16	Quite fluent speech with some prompting and scaffolding required to recall and structure a narrative. Reading and writing level of age 6/7 (school estimate).	Down Syndrome Autism Spectrum Disorder Moderate Learning Difficulties (MLD)	Rachael (mother)
George	6	Uses symbol book – can independently navigate between multiple pages to find and point to desired symbol. Some emergent speech, not always clear. Some emergent whole word recognition, ability to type small selection of whole words from memory, and working on writing with pencil in school.	Autism Spectrum Disorder	Emily (mother)
Matthew	9	Working towards making choices using symbol cards in school. No speech, reading or writing. Home communication centres on interpretation of Matthew's idiosyncratic embodied communication.	Genetic developmental disorder* Profound & Multiple Learning Disabilities (PMLD)	Laura (mother)
Shai	10	Makes choices using symbol cards in school. No speech, reading or writing. Home communication centres on interpretation of Shai's idiosyncratic embodied communication.	Syndrome caused by genetic mutation* Severe Learning Difficulties (SLD)	Jess (mother)

* The names of uncommon and therefore potentially identifying conditions are redacted

FIGURE 1: Overview of participants.

a well-developed online support infrastructure including active social media groups, this enabled participant signposting to technical support. AssistiveWare was not involved in project conceptualisation, funding or design.

Each family was provided with an iPad with Pictello app, a protective case and a printed copy of the Pictello user manual (AssistiveWare, 2022). They were signposted to the online support and social media groups associated with Pictello. I conducted an online introductory session with each family to assist with iPad set-up and continued to provide remote technical support to throughout the 12 weeks of fieldwork. Families were instructed simply to use the app in any way which seemed engaging for their child.

Ethics

This study was carried out in accordance with the BERA Guidelines for Education Research (BERA, 2018) and was approved by the author's University Research Ethics Committee. Written consent was obtained from parents. One young person (Gavin) was additionally able to give informed written consent on his own behalf with the support of an easy-read format information sheet and consent form. Children/young people and parents were given pseudonyms chosen by their parent, and potentially identifying details have been redacted. It was agreed with the funder (UK Literacy Association) that families would retain their iPad at the end of the study.

Beyond standard ethical considerations, this study also prompted reflection on the ethical implications of attributing authorship to possibly non-intentional story contributions such as a child giving an embodied response to a prior experience, unaware that it would form the subject of a story. On the one hand, the refusal to acknowledge authorship of children who require the support of a co-author is potentially disempowering and silencing, meaning their 'stories' cannot be heard. On the other hand, the attribution of authorship for a non-intentional contribution could be accused of obscuring the degree of parental editorial and creative control (or the degree of authorial coercion, which is implicit within forms of AI such as word prediction), thus imputing to the child a perspective which is unwarranted. This echoes posthuman debates about the issue of authorship attribution where human and technology are deeply entangled (Adams et al., 2022). In this study, it remained a constant epistemological challenge to navigate between the risk of overinterpreting embodied and physiological responses to an event on the one hand and the risk of committing 'testimonial injustice' (Fricker, 2007, p.1) by dismissing the voice of those who do not express themselves verbally on the other hand. In some research contexts, it would be possible to obtain post hoc participant approval of how a non-intentional contribution was incorporated into a story through verbal member checking, but this was not feasible here. However, in this study, a form of multimodal member checking was conducted in the form of the video-stimulated recall exercise (see below), which involved parent and researcher watching and discussing a video of the child's multimodal embodied response to an iPad story. This scrutiny, combined with the parent's iterative process of refining stories to become more and more engaging for the child in light of their

multimodal embodied feedback, mitigated the risks of stories being written which were distressing or non-engaging for the child or which did not reflect their interests.

Data generation

Complementary forms of data were generated to obtain a multidimensional view of the storymaking process. I collated the stories produced via transfer to the Pictello app on my own device, allowing me to fully experience dynamic elements such as audio, video and page transition. Families submitted home videos which generated insight into the child's embodied responses, contribution to and engagement with the stories. Families additionally completed a weekly email diary, which yielded an 'overtime' perspective on their 12-week storymaking journey. Semi-structured interviews were conducted with each parent (and separately with Gavin) at the beginning and end of the study, the latter yielding retrospective participant reflections on their experiences. The interviews, which were conducted online due to COVID-19 restrictions, incorporated video-stimulated recall, reflection and dialogue (Nind, 2016). This meant that each parent was invited to rewatch with the researcher two home videos of their child and to reflect on the level of engagement suggested by the child's embodied multimodal responses in the video.

Data analysis

NVivo 12 (QSR International Pty Ltd. v.12) qualitative data analysis software was used to facilitate manual coding across diverse forms of data including transcribed interviews, videos, story PDFs and family diary entries. Initially, data were coded on a story-by-story basis. This enabled the production of a one-page summary per story drawing together story content, dynamic features, relevant home video and participant quotations. The data set was then manually re-interrogated on NVivo using the iterative qualitative data analysis framework proposed by Srivastava and Hopwood (2009). This involved alternating between theory and data on the theme of 'authorship', repeatedly moving between the questions *(1) What are the data telling me?*, *(2) What do I want to know?* and *(3) What is the dialectical relationship between (1) and (2)?* This iterative process eventually led to the formulation of the three axes of authorial distribution (interpersonal, technological and temporal) argued for in this paper.

This study was guided by the qualitative rigour framework proposed by Mullet (2018). Member checking was undertaken by sharing with families both interview transcripts and a draft version of this article to enable dialogue about the direction of analysis. Data analysis was shared and discussed with other researchers in conferences and research seminars, which can be useful to foreground researcher 'blind spots' or unwarranted interpretations. I kept a reflexive journal throughout the research, which provided a space for exploring my evolving understandings and feelings in relation to the data (Ortlipp, 2008).

Findings and discussion

Here, I argue for a model of distributed authorship with three axes (Figure 2), each of fluid and varying prominence for each participant and within each story. Each axis is discussed in turn.

Technological distribution of authorship

All texts are mediated by the technology which produced them, from pen and paper to iPad apps (Norris, 2004). Each story was inevitably shaped by the affordances of the app, for example, the linearity of the page turning, the predetermined size of image and location of text and limitations to the size of uploaded videos. Here, however, I focus specifically on the two young people who were most directly engaged with story assemblage—Gavin and George—and consider how *authorship* of their stories might be described as distributed across human and technological actors.

Gavin is 16 years old and has a conversational level of spoken language. He has reading and writing skills estimated by his mother Rachael to be at the level of a typically developing 6–7 year old child. Gavin has the labels of Down's syndrome, Autism Spectrum Disorder and Moderate Learning Difficulties (MLD). In this project, Gavin was actively involved in deciding on story topics, uploading photos and videos, typing text, making editorial decisions about page order and content and recording his own voice. Rachael provided scaffolding such as curating relevant images and videos and assisting with spelling.

Gavin's authorship could be described as technologically distributed in two ways. Firstly, the Pictello app has a word prediction feature, which uses bars above the keyboard to predict both the ending of the word you have started to type as well as the likely intended next word (Figure 3).
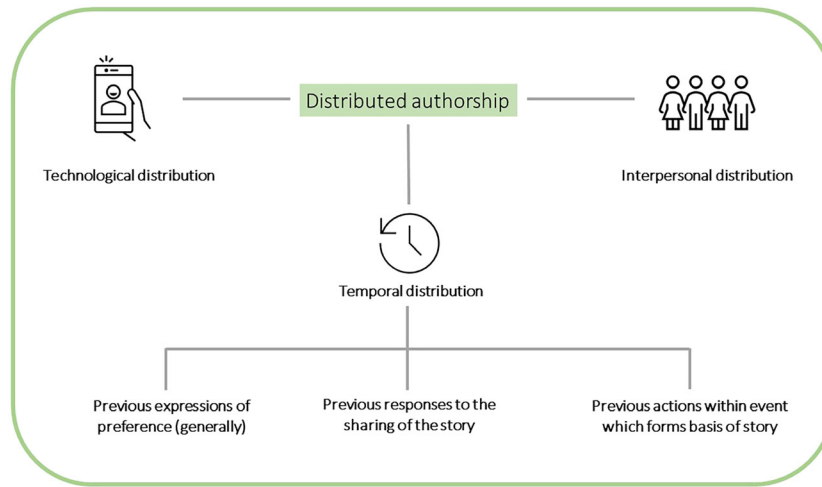
FIGURE 2: Model of distributed authorship.

Rachael was initially hesitant about the use of word prediction, noting 'You feel that they should put in the work … [that's] the lazy way of doing it'. However, she later began to see the benefits in terms of Gavin's increased motivation to compose longer texts: 'if it makes his life easier and motivates him to want to do more, then the predictive text thing isn't a bad idea'.

Secondly, the app permitted Gavin to record himself narrating his typed text. This brought him a lot of pleasure: in one home video, he shouts *'YES!'* in delight when using playback to check his recording. This

FIGURE 3: Word prediction feature in Pictello.

facilitated authorship through the modality of speech, and Rachael commented that the app thereby gave them a valuable opportunity to work on developing an engaging 'story voice'. In fact, the Pictello app can facilitate direct verbal dictation of text, thus bypassing the need for typing completely. Rachael and Gavin did not use this feature, but Rachael reflected on its future affordances: 'he'd say a lot more, he'd put a lot more down if he was able to miss out that middle step [of typing]'. This calls to mind AI technologies providing near-instant speech-to-text transcription which are already ubiquitous on mobile devices, enabling authorship—for example, of everyday text messages—by traversing speech-text modalities instantaneously.

George is 6 years old and uses some verbal speech: He can say some words and short phrases such as 'open, please' and 'thank you mummy'. George can type some familiar words such as *George* and *Mummy* from memory and can recognise some frequently seen words such as the name of his street. George has been identified as having Autism Spectrum Disorder. George and Emily submitted four stories to the project: two assembled by Emily and two by George. The latter two contained only one page each: *Mummy George* consisted of a photo of George and Emily with the text 'Mummy George', whilst *George is On* consisted of a photograph of George and a friend bouncing on a trampoline and some text that was not entirely comprehensible (Figure 4).

Emily explained that she was initially scaffolding the intended typing (*George Is On the Trampoline*), but after typing *George Is* … George became distracted by his discovery of the word prediction feature and this explains the ensuing text:

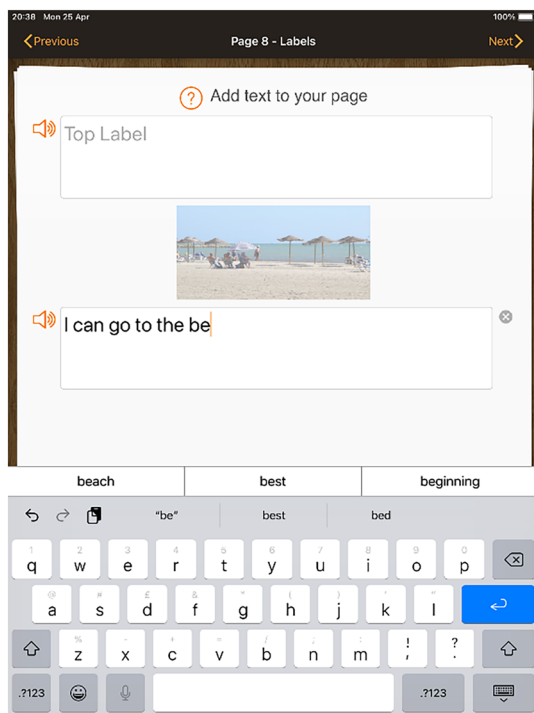He was … just pressing the middle button. And he was giggling his head off. And then he was pressing and
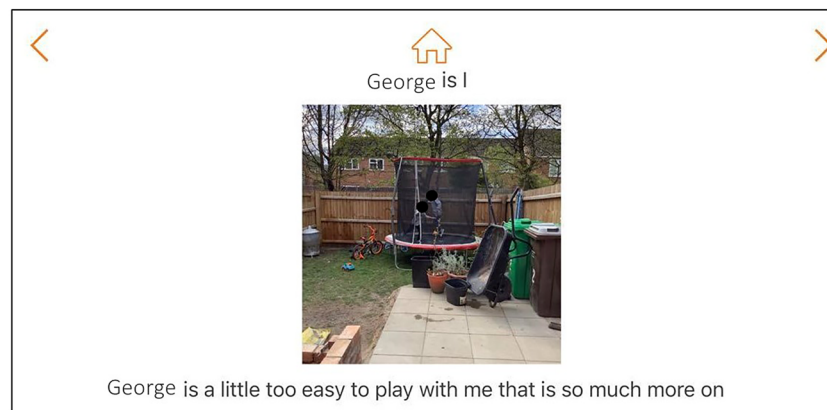
FIGURE 4: Page from George's story 'George Is On'.

pressing it and then listening to it back and repeating it and copying it.

This story is technologically distributed insofar as George has managed to produce a greater quantity of text than he would have done alone. Even though the resultant text does not entirely cohere, the value of the *process* of producing extended text for George should not be underestimated. As Emily noted, using the predictive text feature brought him a great deal of pleasure and engagement, which is consistent with the emphasis on playfulness and positive affect in multimodal literacies research (Lenters, 2016). It additionally allowed him to experience the relationship between the written and spoken word in a playful context and to use the word prediction feature as a model for developing his own speech.

Interpersonal distribution of authorship

The second dimension of distribution is *interpersonal*. This could be conceptualised as proximal interpersonal distribution of authorship—direct scaffolding of story assemblage—or in terms of a more distal form of intertextuality (Kristeva and Moi, 1986) by drawing material from beyond the immediate environment. There are myriad interesting examples of intertextuality throughout the stories: for instance, Gavin recording the word 'FAB-U-LOUS' in the style of a famous catchphrase from the UK television programme *Strictly Come Dancing*. Here, however, I focus analysis on the more immediate sense of scaffolded story assemblage.

As noted previously, Gavin plays an active and generative role in suggesting and organising content, with spelling, curating and editing assistance of his mother as 'creative-scriber' (Satchwell, 2019, p.80). Rachael described the process thus:

I've tried to get him to do all the typing. We probably come up with a sentence together, although that can vary, sometimes it's his idea … I'm still having to sort of guide him as to where the letters are.

For Eve, Matthew and Shai, it could be argued that parents simply assumed authorship by assembling stories themselves. However, this could also be conceptualised as a form of interpersonal distribution, with parents transcribing into story format an embodied prior experience that was 'authored' by the child. This argument is closely intertwined with the *temporal* axis of distribution, discussed later. For instance, Matthew visited a castle, Shai had a birthday party, and Eve went to the seaside—and each child 'authored' their embodied responses to the day, whilst parents assumed the task of compiling the resultant photos and videos into a story, which was sometimes also translated to text.

A telling example is the story about Matthew's visit to a castle. Matthew is 9 years old and is a wheelchair user with the label of PMLD. Matthew does not use verbal speech and has very limited use of symbols, so his family are adept at interpreting his embodied idiosyncratic communication. Matthew's mother Laura reflected on how the castle visit would be experienced differently by Matthew as a wheelchair user who is predominantly a 'Sensory Being' (Grace, 2017), and these reflections determined story content:

He likes the trees and the shady areas. Feeding of the ducks he finds really funny … the cobbles as you get round to the castle itself, he always has a really mixed response to … it is really, really bumpy. So as he goes over it, sometimes he tolerates it, sometimes he gets a bit fed up. So I wanted to make a story to reflect his experience really of it … he has a very different experience of those things.

Here, Laura is respecting Matthew as a kind of 'author' of his own visit to the castle, recognising that the

features of the visit which are salient to others are not necessarily so for him. His neutral/slightly negative response to the wheelchair going over cobblestones is honoured in the story, with Laura audiorecording 'I don't know if I like it!' in a comic shaky voice, like someone being jiggled around (Figure 5).

This recognition of Matthew's experience recalls Satchwell's (2019) description of disabled children as 'privileged possessors of the knowledge of their own lived experience' (p.79): Laura has attempted to transpose Matthew's embodied sensory experience into a story format by adding her own linguistic and editorial capabilities. However, this interpersonal distribution of authorship is different from the story co-construction of Gavin and Rachael, where Rachael's role was similar to Satchwell's (2019) idea of the 'creative-scriber'. Here, Matthew's contributions might be seen as having parallels with the dragon drawing, which was incorporated into Satchwell's (2019) story: Matthew presumably did not *intend* his embodied responses to the castle visit to constitute contributions to an iPad story. This problematises the nature of the relationship between intentionality and authorship and echoes the complexity of establishing originality and authorship in the case of digital *mashups* (Thompson, 2011). It also relates to the ethical conundrum of attributing authorship to non-intentional story contributions, as discussed previously.
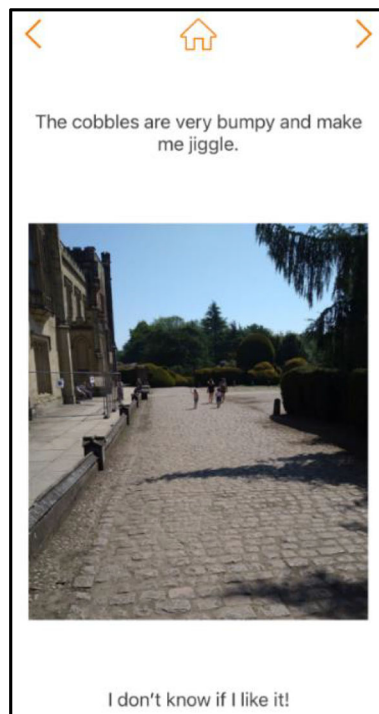

FIGURE 5: *Page from Matthew's story 'Visit to a Castle'.*

Temporal distribution of authorship

Closely related to *interpersonal distribution* is the third axis of *temporal distribution*, reaching back in time to encompass authorial significance of the child's past actions. This was true of all participants but was particularly important for the two participants identified as having PMLD (Matthew and Eve) to be recognised as co-authors. It is generally true that embedded within all texts are *frozen actions* (Norris, 2004) from the past, and this is just as true of a non-disabled child writing an account of their weekend as it is of the current participants. However, for children who do not use language, the significance of these past actions is multiplied because multimodal embodied responsiveness to the prior event constitutes simultaneously the story subject matter *and* the authorial contribution. This means that to recognise authorship, it is more important than for a non-disabled child to look beyond the moment of story assemblage for moments of agency and story contribution in the past. Further, it is true that in practice, the temporal dimension of child authorship is acknowledged and brought into play by the parent or supporting story partner—the *interpersonal* dimension. However, the temporal dimension is nevertheless represented as an independent rather than a subordinate axis because the diagram depicts the *conceptual* shift that is needed for 'authorship' in principle to be accorded to those who may not demonstrate authorship in the typically conceived sense of here-and-now story assemblage.

Here, this temporally distributed authorship took at least three forms. Firstly, parents consciously incorporated the child's known preferences and interests based on their knowledge derived from previous interactions. For instance, Eve's mother incorporated Eve's consistent preference for rhyming stories by writing all Pictello stories in rhyming format. It could therefore be argued that Eve's prior agency in expressing her preferences for rhyming stories through embodied responses such as facial expression and eye gaze made an authorial contribution to the Pictello stories. Secondly, parents engaged in an iterative process of observing their child's responsiveness to earlier Pictello stories and subsequently adjusted the content and format of later stories. For instance, Laura noted that Matthew's embodied responsiveness to Pictello stories indicated maximum engagement when she audiorecorded her own voice and added special sound effects: 'every time we've done a story, it's got better, and he's responded more positively to it as we've made changes'. This embodied responsiveness to earlier Pictello stories demonstrably influenced the decision-making of parents relating to later story

format and content and could be conceptualised as a temporally extended form of co-authorship.

The third form of temporal distribution is the child's embodied contribution to a specific prior event, which is captured through photo or video and directly incorporated into the story. For instance, at the castle, Matthew was an active participant: he tasted ice cream, laughed at the noises of the geese, spent time gazing upwards at trees and expressed displeasure at the sensation of his wheelchair on cobblestones. Had he foregrounded other aspects of the visit, his Pictello story would have looked significantly different. Following Norris (2004), there can be no sustainable distinction between a multimodal embodied 'event' (the visit) and a 'text' (the story) on the grounds of materiality, since even Matthew's laughter and eye gaze has its own 'momentary materiality' (Norris, 2004, p.43). Such text/event boundaries are further blurred by the transposition of such embodied moments into photo or video, which then come to constitute the materiality of the story. Matthew could therefore be considered the 'author' of an embodied multimodal text (his lived experience of the visit), which has been converted to a story format by his mother in a form of transmodal intertextuality. This argument also has some parallels with argument of Grace (2017) that a *Linguistic Being* (Laura) can offer to a *Sensory Being* (Matthew) 'a link with the world of words' (p.10); whilst Matthew can offer in return a focus on savouring everyday sensory experiences.

Concluding remarks

In this paper, I have argued for the concept of 'distributed authorship', which acknowledges young people with the most severe disabilities as contributing co-authors to iPad stories. Authorship is argued to be distributed over across three axes: *technological* involving authorial support from the affordances of the app and iPad; *interpersonal* involving scaffolding from another person; and *temporal* as it reaches beyond the moment of story assemblage to encompass past actions of the child.

This argument is important in theoretically developing the concept of 'authorship' but also has important implications for pedagogy, educational policy and practice. For instance, it was a challenge to recruit families of the most severely disabled children to this study even when recruitment materials explicitly welcomed them, with many parents expressing doubts that a 'literacy' or 'storymaking' app could be relevant to their child. Matthew's mother Laura described how she initially questioned 'was he the right person to be part of this study'. Eve's mother Anna noted that children with PMLD were more typically directed to

sensory 'cause and effect' apps—for example, where placing your hand on the touchscreen is rewarded with a visual burst of fireworks or a sound effect—and subsequently had not considered the possibility of storymaking apps like Pictello. By repositioning children with the most severe disabilities as co-authors through the lens of distributed authorship, engagement with storymaking is legitimated as a worthwhile and meaningful activity, which in turn contributes to wider goals of 'inclusive literacy' (Robinson et al., 2019).

It is acknowledged that the proposed model of *distributed authorship* can be subjected to critique, and further research is needed to unpack its strengths and limitations. For example, there have been recent calls for high expectations of conventional literacy and explicit phonics-based instruction for *all* learners irrespective of disability (Browder et al., 2009; Bryan, 2018). 'Inclusive literacy' approaches such as Multi-Sensory Storytelling (and presumably therefore also distributed authorship) could be accused of distracting educators and families from pursuit of the goal of conventional literacy, although whether this is a feasible goal for the most severely disabled learners remains a matter of debate (Doak, 2021). Additionally, as discussed previously, there are complex epistemological issues involving intentionality and authorship, and risks of imputing authorship to a story assembled by a parent, which the child does not enjoy or approve. Whilst this question merits further research, I have argued that the video stimulated recall-based discussions of the young person's degree of engagement with their stories mitigates this concern. By repositioning young people with the most severe disabilities as capable of distributed co-authorship, it is hoped that they can be recognised as creative and agentic tellers of stories worth sharing.

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Conflict of Interest

None to declare.

Ethics Approval

This project was approved by the author's institutional Research Ethics Committee.

Permission to Reproduce

AssistiveWare has given permission for the reproduction of screenshots from the Pictello App.

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